7 July 1965

Dear

Recently I supported a visit to Graz, Austria and Moscow, U.S.S.R., by who had been invited to attend several informal conferences on the matter of electro-sleep and electro-anesthesia. Subsequently on his return, he spent the week of June 27th in my office reviewing his material and preparing a report on his visit and experiences.

There was no aspect of his trip or his visits which were involved in any security classification and therefore his final report is an unclassified one. Knowing of your past interest in this area of work, I am enclosing herewith a copy of report which you may retain for your own purposes.

Kind personal regards.

Sincerely,

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REPORT ON ELECTRO-SLEEP AND ELECTRO-ANESTHESIA

IN EUROPE AND THE SOVIET UNION

Historical.

I have been actively engaged in the field of electro-anesthesia for approximately three years. This interest occurred academically at first, because of my curiosity regarding animal work, at which time I participated in the building of a unit for experimental purposes.

After an initial success, four individuals, including myself, formed a corporation, to produce and market the instrument. It was my responsibility to introduce the apparatus to medical institutions, and attempt to get research programs started. In this connection I participated in original research as well as cooperated with practically all individuals in this country working with electro-anesthesia.

Our small corporation was bought out by a large organization in July, 1964, and I joined it in the same capacity I had been fulfilling with In February 1965 I severed connections with this company.

As part of the introductory process I have presented papers and seminars to various branches of the government, American Veterinary Medical Associations, the Atomic Energy Commision, medical schools, and the Bio-Engineering section of IEEE I also took part in the first bio-engineering symposium held at

I was one of the individuals responsible for organizing the first and second symposiums for electro-anesthesia held in and in Colorado and Tennessee, respectively.

At the where I presented a paper, I met with a visitor from who issued an invitation for me to come to a meeting to be held in Graz, Austria in May, 1965. Further developments led to my visit to the Soviet Union and other European countries during this period.

The purpose of my trip to Europe was to determine different methods being used to produce electro-sleep and electro-anesthesia and to evaluate the effectiveness of those methods. Of primary concern was securing information regarding methods presently in use in the Soviet Union.

Basically, I was to inquire as to the use or possible effect of electronic techniques with hypnosis, sleep, narcosis and electro-shock

therapy.

This report will be in two sections, the first concerning electro-sleep and the second, electro-anesthesia.

PART I : ELECTRO-SLEEP

I attended a conference organized by Dr. F. Wageneder at the University of Graz, Austria for the purpose of discussing electro-sleep. It was assumed that the participation of a group from East Germany might lead to an invitation to visit their facility and gain more knowledge of what was going on in the eastern countries.

Professor Dr. M. Herbst of the Karl Marx University, Leipzig, East Germany did attend but was no help. He was not aware of the latest techniques in either the East or West and seemed to be present more in the capacity of an observer rather than as a participant.

Hoping to further my contacts, it was arranged to have Dr. Wageneder call Dr. M. G. Ananev in Moscow and inform him of my visit to Graz and the fact that I had been on the program Symposium in April. As hoped, Dr. Ananev asked if it would be possible for me to visit with his group; after some trying moments this was arranged and results will be covered herein.

Dr. Wageneder has a financial interest in AVL, a company that is producing his "Electrodorm", a sleep machine patterned after the Soviet "Electrosohn", actually incorporating the latest techniques presently in use but not yet adopted in the commercially available Soviet instrumentation. This unit uses a combination AC-DC current. The frequency of the square wave component varies from 30 to 250cps. The width may be varied from .2 to 1.4 millisec. The current is adjustable from 0 to 5 milliamperes.

There are now three sleep stations in operation in Austria: the one already mentioned in Graz, another operated by Till Tesarek, Ph.D, M. D., in Vienna, and a third by Prim. Dr. Stepan in Hartberg. In addition, units have been purchased by Dr.'s Leonhard, Vorau; Konrad, Klagenfurt; and Eichhorn, Graz.

According to the distributing firm, Schoedelga, Vienna, orders have been received from almost every part of Europe. Units delivered outside Austria to date include those to Prof. Bartschi-Rochaix, Bern, Switzerland; Dr. Hochmuth, Berlin, West Germany and Dr. Natalie Krumovska, Sofia, Bulgaria.

I received information that sleep clinics had been set up in the following locations, with the Soviet apparatus, or a home-made model:

Czechoslovakia - 10 stations
Bulgaria - 5 stations
Hungary - 5 stations
Israel - 1 station
Soviet Union - 300 stations
Paris, France - Dr. A. Limoge
Paris, France - Dr. A. Djourna
Altjessen, Germany - Wolfgang Rentsch
Wolfsburg-Wiesengrund, Germany - Dr. Siegfried Koeppen
Zagreb, Bogoviceve - Prim. Dr. Arnulf Rosenzweig

All of these centers are under the direct supervision of Medical Doctors and trained medical technicians.

The Graz center has been in operation two years utilizing 6 units and is solidly booked until September. Dr. Wageneder has presented very ambitious plans to the Austrian government for a new complex to house a large sleep center and research facility, and he claims they are looking favorably on the proposal.

I questioned Dr. Wageneder as to where his patients come from and how they find their way to his clinic (operated in the Medical School Hospital). He replied that most of them are referred by other doctors from throughout Europe. He said others have come after reading stories in the newspapers and magazines. During the time I was present, his patients were from Austria, Denmark, Switzerland, Hungary and Germany. Most were being treated for sleep disorders.

Conversations with Dr. S. Roitenburd, generally regarded as the father of electro-sleep and Dr. W. W. Banschtschikov of the Soviet UnionSociety of Neuro-pathologists and Psychiatrists brought out the following points. First and foremost, the Soviets regard the term "electro-sleep" as a misnomer, they do not expect nor particularly desire their subjects to sleep during treatment. They continually stressed the fact that "electro-sleep" is a form of therapy, and insisted it is just coincidental that it will help those persons afflicted with problems related to sleep. The main reason being that those problems are generally related to the nervous system, and it is felt that the total nervous system is being treated with the instrument. In addition, it was made quite clear to me that a series of at least 20 consecutive treatments was necessary to achieve a true therapeutic effect.

Dr. Till Tesarek, Vienna, advanced the theory that the current acts as a stabilizer to the para-sympathetic vaso-depressive function and it is not strong enough to go through the brain, but rather enters through the blood system, veins, arteries and then spreads throughout the system.

Tesarek feels that insomnia is just a symptom of another disease, and that when you treat that disease with electro-sleep, insomnia dis-

appears also. He felt it had particular advantage in giving relief to older patients afflicted with the symptoms of arteriosclerosis, headaches and vertigo. He claims, as do the Soviets, that he can bring about a lowering of blood pressure in hypertensive individuals, where the cause is not organic, and control it with the use of electro-sleep, without any form of drug treatment. Dr. Roitenburd claims cures of Buerger's disease, with no recurrences for over eight years. The example was also cited of a patient with an ulcer confirmed by X-Ray who started taking electro-sleep treatments for a nervous disorder, during the course of treatment he happened to have another X-Ray taken, at which time it was noticed the ulcer had disappeared. This was reported by all workers using the treatment for a considerable length of time, i. e. Banschtschikov, Roitenburd, Wageneder and Tesarek.

I questioned the Soviets about the use of conjunctive drug therapy, and all replied that unless the individual was in a hospital for treatment, there was no use made of conjunctive therapy. Drugs were never used in any of the clinics in combination with electro-sleep.

All the Soviets were firmly convinced that NASA was using electro-sleep on the astronauts in the Gemini series, that there was a good deal of work going on in the U. S. and that we just were not talking about it. I explained to them that we knew it was being used in the Cosmos series, which they denied vehemently. After one day of talking, I think I finally convinced them that I was telling the truth about our lack of use of electro-sleep.

At this point they became rather incredulous, expressing the feeling that it was inconceivable to them that in a country as medically advanced as the U. S., we would not be making full use of a tool as successful as electro-sleep.

They stated that even though we might feel the claims were exaggerated, or even if we felt they were outright lies, the fact remained that the treatment was harmless, and we should at least have investigated the procedure to find out for ourselves.

When questioned as to use in their space program, Roitenburd said, "It hasn't been used yet because the capsule can't contain any sophisticated equipment, only that necessary for maintenance in space." He did say that all the cosmonauts were undergoing electro-sleep routinely in their training program, and that its future use is anticipated. Presumably it would be useful in four ways: (1) to establish new sleep-work cycles; (2) use in space during extended travel where sheer fatigue is a problem; (3) if something should go wrong in space such as emotional disturbances, nervous disorders, etc., when recovery has been made the period of treatment could begin immediately with quick results without any waiting period; (4) its routine use putting the men and women in a relaxed, receptive frame of mind.

Further investigation is being conducted in connection with overcoming jet-flight fatigue involved in time zone changes, presumably it is also being experimented with in extended transportation in the Red Army. They claim very promising results.

Roitenburd says whenever he goes into different time zones he gives himself a one hour treatment on arrival and is quite refreshed and ready for work at its termination. It seems that it is being used as an aid to promote the adaptive process generally.

Roitenburd and Banschtschikov both stated that the published reports of one hour of electro-sleep being as good as eight hours of normal sleep are true, however both maintained that they never intended to suggest that this could be used in a situation whereby a man would work eight hours, sleep one, and then work eight again. They felt that it should be obvious to medical personnel that this would not be possible; they were only relaxing the nervous system, nothing else, and felt unhappy that the U.S. popular magazines reported it in that manner.

They were also most insistent that a course of at least 20 treatments was necessary to get the true therapeutic value; the treatments are given 5 days a week for four weeks. I inquired about a possible placebo effect and all Soviet investigators agreed that it was possible to obtain this in so far as the sleep was concerned, but all maintained that in the control groups of many studies made by them, no therapeutic value was seen.

Dr. Kuzin, Chief Surgeon, First Medical Institute of Moscow, did not feel electro-sleep was really a subject for much more research, as they have been using it routinely for a number of years. He is using it in post operative care and in conjunction with local anesthetics to achieve optimum effect and relaxation of the patient.

In questioning about other facets of its use, i. e. hypnotic effect, etc. it was brought out that patients have received relief from ~~both~~ epileptic attacks (not specified whether grand mal or petit mal) over an extended period, after electro-sleep treatment (without further drug therapy) and the fact that there had been no recurrences of Buerger's disease in five patients over an eight year period was also cited. I gathered the impression that electro-sleep is now a routine measure given in treatment of Buerger's syndrome. I questioned Dr. BanschschiKov about possible hypnotic suggestion made during the period the patients were actually asleep (one-third do sleep during treatment), and this was the only time during the visit that I felt he attempted to evade the question. He talked a lot about many things, but would not give a straight answer to that.

Dr. Roitenburd maintained that electro-shock therapy is practically non-existent in the Soviet Union at this time, that those cases

previously treated in that manner were now undergoing extended periods of electro-sleep, and in some cases were receiving drug therapy also. Interestingly enough, Dr. Tesarek felt that electro-sleep was of no value in treating individuals with deep neuroses or hypochondriac symptoms, such as would ordinarily need 3 or 4 years of psychiatric care. The Soviets did not share this view at all.

Much to my surprise the Soviets, including representatives of Med-export, told me that the rights to the Electrosohn in the United States had been sold to General Electric Company.

One of the newer developments technically in this field is the use of white noise as a substitute for the square wave in the apparatus. Both the Soviets and Wageneder mentioned this, and Wageneder is supposed to send over a prototype of a new machine making use of this principle. He is also sending one of his standard commercially available instruments.

The procedure after an individual has been accepted for treatment is as follows: (1) the patient is given a thorough physical examination by the physician; (2) upon admission to the clinic a chart is prepared (Inclosure A) indicating the complete data to be taken during the electro-sleep treatment; (3) in a quiet, darkened room the patient changes into hospital pajamas, lies down and the electrodes are adjusted; (4) an M. D. slowly turns up the current until the patient reports a tingling sensation. No further increase of current is indicated and the patient is left alone for the remainder of the treatment. Normally the current used is 1.2 milliamps.; the frequency of the square wave component is 100cps although recent workers report good results with frequencies up to 250 cps. All workers claim that there is no evidence of cataract development and the Soviets in over 100,000 cases have not reported any statistical increase over that normally expected in the population. Although the initial treatment is given by an M. D. usually a trained nurse gives subsequent treatments.

The timer is set, ordinarily for 90 minutes, when the instrument automatically shuts off. If the patient is sleeping at the time, he is left alone until he awakens. Routine checks are made, of course, to determine his condition and the operativeness of the instrument. The electrodorm has built-in devices to shut off automatically if the electric current reaches 5 milliamps.

SUMMARY

(1) No ill effects have been reported by any of the workers.

(2) The patient is not expected to sleep during the treatment, although one third do so after the first few treatments.

(3) A course of at least 20 treatments is absolutely necessary before it may be determined the treatment is not effective; sometimes the effect will show up shortly after the 20th session.

(4) There may be an intensification of the symptoms being treated during the 5-12th sessions, after which they will disappear gradually.

(5) Each treatment lasts from 60-120 minutes depending on the conditions involved.

(6) Placebo effect may be seen in so far as one third sleeping are concerned, but in no case will there be any therapeutic effect seen.

(7) All diseases of the nervous system are considered for treatment by electro-sleep.

(8) A physician is in charge of all sleep stations, assisted by medically trained personnel.

(9) Treatments are evaluated as one third successful, one third partially, with complete success coming late in treatment, one third unsuccessful.

(10) Routine use of electro-sleep therapy was accepted without question by every individual with whom I came in contact in the Soviet Union.

The importance of electro-sleep in the Soviet Union may be seen from the fact that there are over 300 stations now operating, each with an M. D. in charge. Officials seem so convinced of the effectiveness of treatment that Banschschikov and Roitenburd report difficulty in obtaining more funds to do further research; the feeling being that its value has already been proven.

While the claims for electro-sleep seem grossly exaggerated, and even suggest "quackery", the fact remains that data is available on over 100,000 patients treated over the past 12 years. In addition, personnel with whom I had contact in Austria, Switzerland, France and Italy fully corroborate these findings.

This leads us to the inevitable conclusion that in the United States we have had a gross misconception of the use of electro-sleep techniques, and this with a lack of accurate information as to the methodology involved has in effect halted research in this country. Perhaps the biggest misconception of all is the commonly held belief that electro-sleep means just sleep, which as it turns out is not the case at all.

Dr. Banschschikov is holding a meeting in Moscow during August on the subject of sleep. The meeting, closed except to invited officials and doctors in the Moscow area, will consider the latest techniques in electro-sleep, the results of the past 10 years and the direction research should take in the future. Presumably this will be part of a campaign for more funding from the government. I have been told that

if I am able to be in Moscow at that time it will be arranged for me to attend the symposium, with an interpreter to assist me in understanding the discussions.

PART II

Electro-anesthesia

Upon arriving in the Soviet Union I immediately attempted to contact Dr. Ananev, but since it was a Sunday, I was unsuccessful. The following morning we did make contact and I was taken by car to the Research Institute for Experimental Surgical Apparatus and Instruments. After much preliminary formality I was introduced to Dr. Valentina L. Deryabena of the Institute, whom I found was in charge of the work being conducted in electronic anesthesia. Following introductions we, accompanied by two interpreters, went to the office of the director where we spent considerable time discussing the field in general. After about two hours the second interpreter left us and the talks continued.

I found that quite by coincidence I had appeared on the scene at the same time the bi-annual meeting of the Institute was being held. As far as was known in the office of the Air Attaché in London I was the first American allowed to attend. At the conclusion of the papers in which I was interested, I was asked to present a short talk on the state of the art in the United States, which I did.

Now as to the actual information exchanged, first of all the Soviets were thoroughly familiar with all the work published in the U. S. They quoted liberally from reprints of Knutson, Hardy, Smith et al. They seemed quite surprised that I was not familiar with their recent work in the field. This led to a general discussion of the difficulty in exchanging information quickly, without having to wait for the Journals, which sometimes have delays up to 18 months in the printing of submitted articles in the Soviet Union as well as here. We all agreed it would be advantageous to set up a system whereby one central location, whether here or there, would receive at least abstracts of current work and then publish a monthly or quarterly bulletin, so we would all be up to date, and eliminate the present information gap that exists. I feel it would be possible to do this and would very much like to see the possibility explored further.

In the opening period of our talks I mentioned our recent work, especially the papers presented at the [redacted] Symposium, and in turnattempted to determine the current state of the art there. We sparred for quite a while, but when the second interpreter left the room, Dr. Deryabena seemed to loosen up and the information came quite readily. I don't know the significance of this, but it did occur in that manner.

At first she told me they had experimented with the sine wave at 700 cps as reported by many of our investigators, but they did not like the results. When I asked about the combination of AC-DC that had been reported from the Soviet Union, she said "Oh, we haven't used that for five years." She seemed honestly surprised to hear that we were still attempting it. At that point it came out that that while Dr. Ananev was generally given credit by the western countries for the work, she and her collaborators had actually been responsible. All published papers from the Institute list Ananev as first author, since he is the director.

She also mentioned they had experimented with square waves, white noise generators, triangular wave forms, etc.,but seemed a little reluctant to say what was actually being used. At this point she mentioned that in the next session a report would be given on the use of electro-anesthesia in human subjects and I would learn what I wished there, and would be introduced to the doctors who had done the investigating.

Last year Dr. [redacted] while attending the Symposium in Colorado made mention of the fact that a Soviet scientist visiting his hospital in San Francisco had started to tell him of a new development in electro-anesthesia, and had in fact started to draw pictures of a new type of wave form being tried. At this point one of his fellow scientists said something in Russian and the man said he was sorry but he couldn't say more. Dr. [redacted] Foundation had somewhat the same experience.

At this point in our discussions I decided to mention to Dr. Deryabena that we had tried a method of mixing the wave forms (which seemed to be what the Russians had indicated to [redacted] She said I would learn all about that the next day.

One point that she was quite emphatic about was that all workers in the Soviet Union had completely abandoned the use of any form of direct current. She said they had definitely established that DC caused morphological changes in the brain, along with behavorial changes and DC was no longer even considered a matter for discussion.

At this point Dr. Geselevich, Deputy Director of the Institute and Chief of Experimental Surgery, came into the room and joined the discussion. He asked how the United States Army was coming along with their field use of the procedure. When I said we were not using it, he became almost belligerent, insisting he knew we were. He went so far as to send a secretary out to try to find a bulletin describing what we were doing, but she couldn't find it. It took a great deal of hard talking to convince him he had misinformation. This once again pointed up what misunderstandings have occurred in this field. He felt

we were far along and were attempting to hide our findings from him; I answered that this was exactly the attitude prevalent here. At the end he became quite friendly and joined freely in further talks.

In the Soviet Union there are two groups experimenting with electro-anesthesia. The one where I was visiting, and another at Kiev. There seemed to be quite a rivalry between the two, but they both agreed on the new wave form being used.

This new approach is called " interfering current", so named because it consists of four electrodes sending in two separate sine wave signals, in a criss-cross manner. For example if one oscillator is putting out 1000 cps the other might be set for 1300 cps or 2250 cps, etc. The important thing was to keep the second frequency within 100-300 cps of the beat of the first frequency. I will describe this more fully shortly.

At the meeting, the paper dealt with human usage at the First Medical Institute of Moscow and it was presented by Dr. V. D. Schoskovsky and Dr. V. I. Schaskov. They reported over 200 operations on human patients using "interfering current" and gave the results, which were quite favorable. The instrument is being used routinely in their hospital, although it is definitely still considered in the experimental stage and is not in use throughout the entire country as we had been led to believe here. In fact their institution, one other in Moscow and one in Kiev are the only ones doing human work at the present time. They do expect several more institutions to start using it as quickly as they get the personnel trained.

Dr. Deryabena reported on the development of the "interfering current" by the engineers at the institute. She did not mention animal work, presumably because it had taken place years ago. In private conversation she said most of their experimental work had been done on primates. She said that although they were convinced that "interfering current" was by far the best method they had tried, they were not completely satisfied, and research would go forward using new methods as quickly as their scientists could develop instrumentation. From the talk, I gathered financing was not a problem in this area.

The basic idea of the criss-crossing of electrodes in a temporal-occipital arrangement is to make the brain do the work of sorting out the signals coming in. They could not state exactly where this was taking place, and gave the impression they were far more concerned in making it work clinically than in gathering technical information. They maintained that after it became operational, there would be enough time to find out why it works.

Dr. Schoskovsky, who is responsible for electro-anesthesia at the First Medical Institute of Moscow, is an anesthesiologist. He and Dr. Schaskov, the chief of anesthesiology at the Institute met with me after the papers were given.

We spent much time discussing medication during electro-anesthesia. Because of difficulty with interpretation we could not get together on what we were talking about. Interestingly enough, when we left the Institute the doctors were quite adept at English and we then were successful in exchanging information. The institute has been using the "interfering current" for approximately one year in over 350 operations to date, although they only reported on 200. They are quite satisfied with it, but would like to have easier methods of inducing electro-anesthesia, and felt some more advanced wave form might bring about the desired results with less physiological change than is presently the case. At this time they use between 70-100 ma on each pair of electrodes. They monitor the resulting wave form from the patient with an oscilloscope. They do not monitor output of the instrument. I explained we were mixing our wave form in the machine, and they stated that this defeated the entire purpose of the mix; in other words the brain must be forced to do the work. I expressed a desire to see the instrument in operation if possible, assuming it would be used on an animal, if anything. They talked for two or three minutes and said they would pick me up the following morning for a demonstration.

SURGERY

When I arrived at the hospital in the morning I was quite surprised to learn the demonstration was to be on a male patient. To me this indicated a great deal of confidence in the procedure and equipment. They had arranged this in a matter of minutes. The operation scheduled was the surgical removal of the thymus in a patient with myasthenia gravis. The subject, a Soviet man, was about 35-40 years old. He was given a very short-acting (the effect lasted only three minutes) curare type drug and a local in the vicinity of the electrodes. They said that while they, on occasion, do give a light tranquilizer the day before an operation, and sometimes on the same morning, they had not done so in this case. The man was fully awake and talking while I was in the operating room. During the three minute period he was intubated and electrodes were emplaced. The current was turned up gradually (automatically from both oscillators at one time) until approximately 50 ma was reached. The frequencies were 1250 cps and 1500 cps, it apparently makes no difference which electrodes carry which frequency. At this point (about 5-7 minutes) the subject's eyes were still open but in a fixed position. He could almost clench his fist on request. The current was turned up slowly to 70 ma at which time there was no

response on the part of the subject. Surgery was started approximately 20-25 minutes after admission to the operating room. Respiration and blood pressure were constantly checked by a technician. There was a slight rise in blood pressure on induction, but it leveled off shortly. Respiration remained fairly constant, except for the first few minutes while the curare was still in effect, no oxygen was given during the operation.

They reported that physiologic accommodation to the current usually occurred at about 30 minutes and this would be evidenced by a slight movement in the hands. It happened at 35 minutes; at this point the current was increased by 10 ma. Despite shouting by the anesthesiologist, the patient did not respond in any way. During the course of the operation, which lasted 2 hours and 30 minutes, the current was increased to 150 ma. The instrument being used was one of their old prototypes and they claimed to have newer and vastly improved models at the Research Institute which would do a much better job. Dr. Schaskov was not sure of the amount of current really being used, and after looking at the condition of the machine I could share his opinion. He apologized, saying that it was all set up so quickly for me that they didn't have time to get the other instrument back. They have much information about the values needed, so were not concerned.

At the conclusion of the operation the current was gradually lowered and when it reached approximately 20 ma the subject started to blink his eyes. The instrument was turned off and within two minutes the patient would obey directions to look to the left or right with his eyes. At five minutes his eyes were clear and at 10 minutes he could answer questions verbally. Saliva became a severe problem shortly after termination and atropine was administered. The endotracheal tube was left in place during the saliva difficulties and was removed at about the 10 minute mark at which point the problem had been corrected. He was quickly returned to his room and placed on the electro-sleep machine. I questioned this since I had been told 20 treatments were necessary for therapeutic value. They replied that it was not necessary in this type of case, they just wanted to relax the individual, and that when the subject was in a deteriorated condition the electro-sleep seemed to have more effect.

I saw him again the following morning, and through the interpreter he said he did not feel or remember anything. The doctors said a few people claim to remember events and five individuals (of the 200) reported headaches the following day. They also reported two cases of post-operative shock which they attributed to surgery rather than the anesthesia. They were not at all convinced one could remember anything after surgery, but thought it could be imagination, stating they get an even higher percentage who claim to remember events after surgery with conventional anesthesia.

In discussion after the operation, the following points were brought out by Dr. Kuzin: he feels relaxation is generally as good as what they get with ether inhalation or intravenous anesthesia or combinations of both. They have performed practically all types of surgery, including abdominal. The nor-adrenalin value is slightly higher than with ether, the cortico-steriod level is the same as with drugs. A slight rise in blood pressure is usually seen. He feels electro-anesthesia is indicated in all hypotensive cases, and agrees that hypertensive individuals should be tranquilized, or given the standard pre-anesthesia treatment which is normally carried out. He stated that their new machine is used normally at one site, and receives considerable usage. They are having another built with capacity for 200 ma.

When I asked how they secure volunteers for this procedure, he stated they may use the instrument on anyone in the hospital and no permission is required. He said it is a teaching institution and patients are eager to go there because they know the finest doctors are on the staff, preferring it to the new hospitals for that reason. He stated that the patients respected and trusted the physicians to use the best treatment and methods for their cases. He pointed out further that very few unfavorable results were reported by the patients.

He said the procedure is still being evaluated, and will be for some time to come. He hopes with more refinements they may be able to get away from any nor-adrenalin change, etc. He stated in answer to a question that there was opposition from some doctors who just didn't like the use of electricity in any form, but that since all the directors were in favor of it, they had no choice but to go along.

SUMMARY

In the Soviet Union there are presently three institutions using electro-anesthesia for human subjects. Two of these institutions are located in Moscow and the third in Kiev. Humans have had surgery performed while under electro-anesthesia since 1960, but the discovery of "interfering current" with the use of four electrodes two years ago has brought it along more quickly since then. Over 350 patients have been operated on at the First Medical Institute of Moscow using this method. Practically all types of surgery have been performed, although the best results are obtained where there is hypotension.

Conjunctive drugs, such as curare, are used if needed. Tranquilizers are given quite often the day before and the day of the surgery, if the surgeon or anesthesiologist feels they are indicated.

Nor-adrenalin and cortico-steriod levels are raised from pre-

operative values. The use of direct current has been totally abandoned because of morphological changes occuring in the brain; they have not found these changes using the "interfering current".

I, despite being up to date on all work being done in this country, could add absolutely nothing to their knowledge of the field. The only area where I was ahead of them came in the recording of EEG during electro-anesthesia. They have not been successful in doing this as yet and are quite anxious to get any information I can supply.

Other than the actual operation itself the most impressive thing was the quick manner in which it was arranged. No backup material was evident, and the surgeons showed complete confidence in the technique. I feel it was significant that they were so willing to allow me to observe their technique that they did everything possible to give me all the assistance I wished. I was in the operating room from the time the patient was brought in until he was taken to his room post-surgery. I am 100% convinced the only anesthetic used was electro-anesthesia.

GENERAL REMARKS

It is my impression that in the Soviet Union electro-sleep is an established form of therapy. This is not yet the case in other European countries which I visited, where there is a great deal of interest but not enough results reported to justify any conclusions as yet.

The fact that workers in electro-sleep are having difficulty acquiring financing from the government, while those engaged in electro-anesthesia are not, reflects the official attitude. While it would be easy to deduce from this that the Soviets do not feel electro-sleep is worth any more money, I do not believe this to be the case. Rather, I feel it indicates the thought that money should not be channeled into an established method, but should go to research in other fields.

It would not be difficult to dismiss electro-sleep as another form of "quackery", and indeed this has been done in the United States; however I must accept the fact that all the scientists, surgeons and psychiatrists to whom I addressed myself seem honestly convinced of the routine use of this form of therapy. It is inconceivable to me that they are all mistaken.

There is a very sharp delineation between workers in the field of sleep and anesthesia. While each is generally aware of what the other is doing, at no time would scientists engaged in investigating one field talk about the other.

My impression from talking with doctors attending the conference at the Institute is that electro-anesthesia will be used in many Soviet hospitals in the not distant future. There are two main drawbacks at the present time. First, not enough anesthesiologists are trained in this method, and second, the instrumentation is not yet generally available. While "electrosohn" has been released for production, the electro-anesthesia apparatus has not. Since it is still in the area of experimentation this may take some time. It is of course difficult to justify training personnel to use equipment, if the equipment will not be readily available.

The trip made me more aware than ever of the need for improved channels of communication in the scientific community. In the specific field of electro-anesthesia it could possibly have saved several years of work, which must be regarded as almost fruitless, if the information gathered is correct. This lack of communication has permitted our scientists to work long hours using a Soviet approach to the problem of electro-anesthesia, which the Soviets abandoned as completely unworkable four years ago. Brain damage as a result of its use has been proved.

The possibility was discussed of setting up a central location for collection of data on a monthly or quarterly basis, and, at the very least, sending out a bulletin abstracting current information. The Soviets were most enthusiastic about cooperating in such a venture. I feel this could be of tremendous assistance to our programs and should be followed up. If this type of program would work out successfully in this field, perhaps it would be adopted in other areas also.

I feel it would also be in our best interests if we could develop some sort of coordination and information exchange between groups in this country. Naturally we could not interfere with original research, but perhaps if knowledge was disseminated more rapidly and accurately between scientists, the work would progress more quickly.

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